Rock Island Arsenal Safety and Occupational Health Council

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OSC - On The Line

Briefing Agenda

- Commander's Opening Comments
- RIA Safety Campaign
- Current Safety Performance
- Status of Computer Based Safety Training
- Safety After Accident Review
- Air Quality at RIA
- Issues from the Council

Commander Opening Comments

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RIA Safety Campaign

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RIA Safety Campaign

- Training in Accident Prevention
- Safety Meetings
- Communication
- Safety Audits/Inspections

Training in Accident Prevention

- **Leaders**
  - CISP
  - Safety Training Requirements
  - Job Safety Analysis
  - Accident Investigation Skills
- **Employees**
  - Safety Training Requirements
  - Job Safety Analysis
  - Hazard Identification

Safety Meetings

- Applicable to all Directorates
- Gear to “Ramp Up”
  - Get Involved
  - Provide Input
- Fixed Agenda and Purpose
- Share Lessons Learned

Communication

- Implement Master Accident Prevention Plan
- Re-Establish Close Call Recall Program
- Initiate Safety Grams
- Share Lessons Learned
- Finalize RIAR 385-2 Update
- Use Electronic Messages

Safety Audits

- New Data Base for Recording and Reporting
- Scheduled and Unannounced
- Prioritize High Hazard and Exposure Areas
- Considering Internal Audits by Organization

Current Safety Performance

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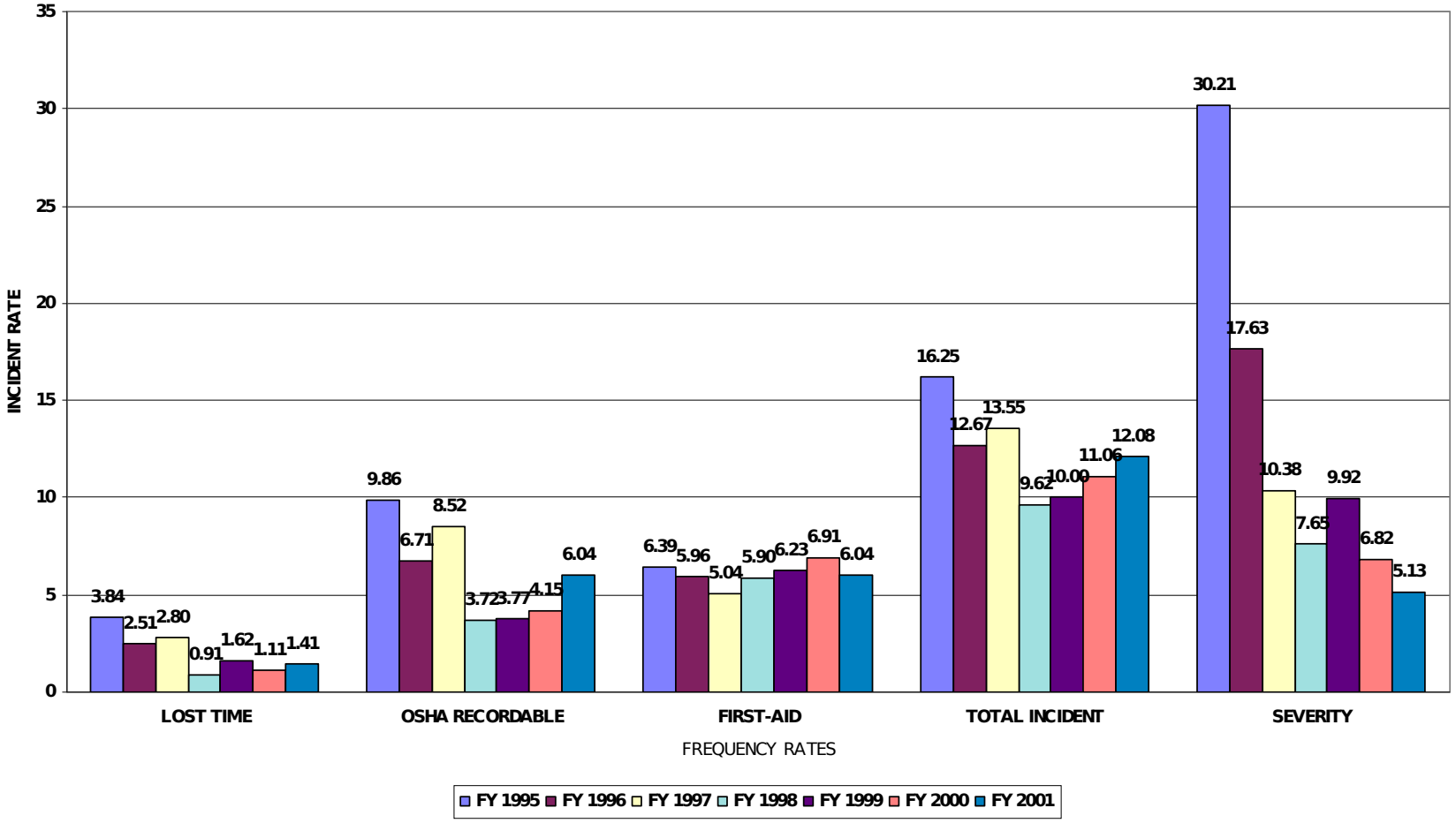
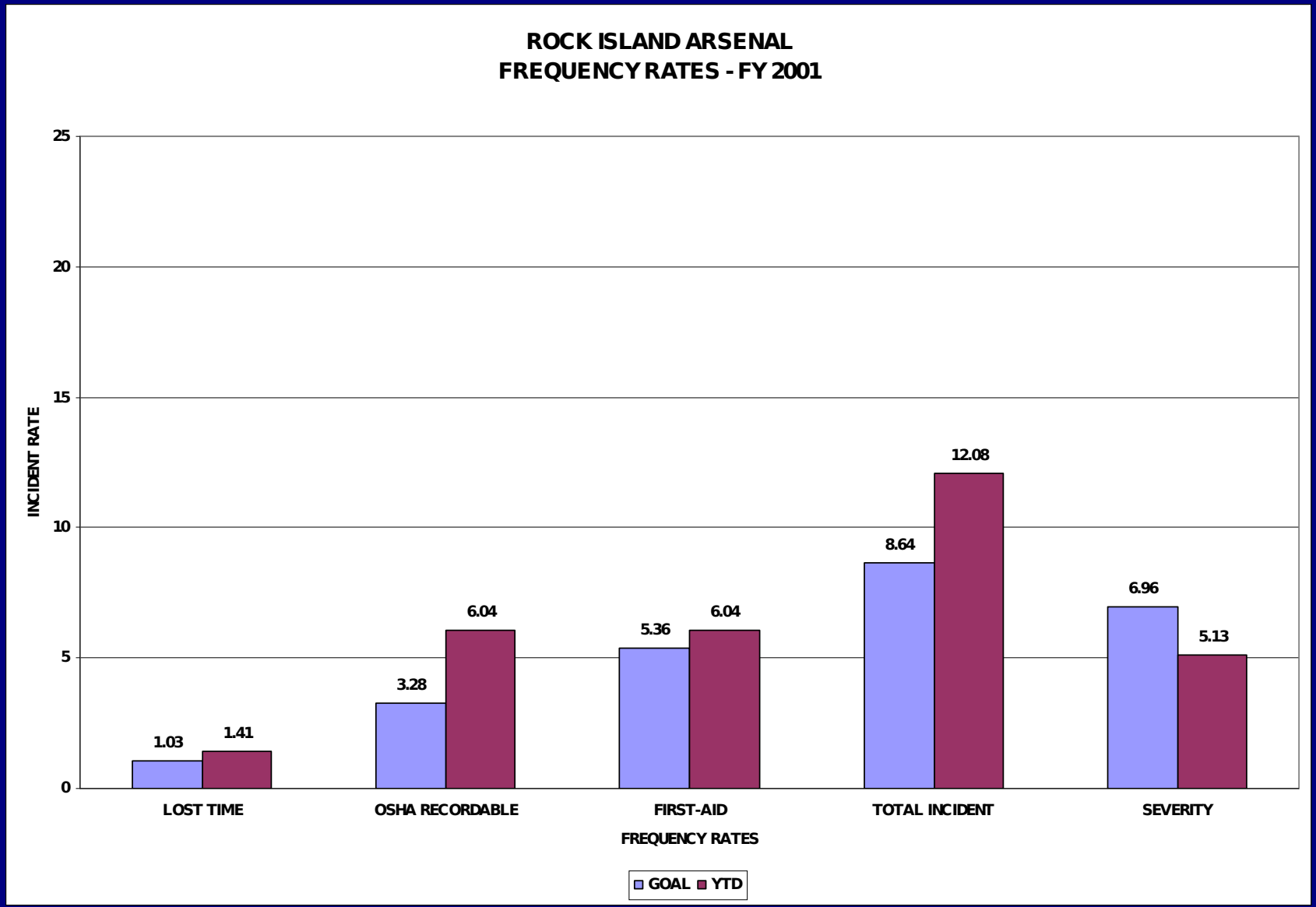
RIA Cases and Frequency Rates FY 2001

CASES	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001
LOST TIME	72	43	45	13	21	12	14
OSHA RECORDABLE	185	115	137	53	49	45	60
FIRST-AID	120	102	81	84	81	75	60
TOTAL	305	217	218	137	130	120	120
LOST WORKDAYS	567	302	167	109	129	74	51
HOURS OF EXPOSURE	3,753,449	3,425,361	3,217,248	2,848,611	2,600,009	2,169,852	1,986,510
FREQUENCY RATES	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001
LOST TIME	3.84	2.51	2.80	0.91	1.62	1.11	1.41
OSHA RECORDABLE	9.86	6.71	8.52	3.72	3.77	4.15	6.04
FIRST-AID	6.39	5.96	5.04	5.90	6.23	6.91	6.04
TOTAL INCIDENT	16.25	12.67	13.55	9.62	10.00	11.06	12.08
SEVERITY	30.21	17.63	10.38	7.65	9.92	6.82	5.13

ROCK ISLAND ARSENAL
SAFETY PERFORMANCE INDICATORS
FY 1995 - FY 2001



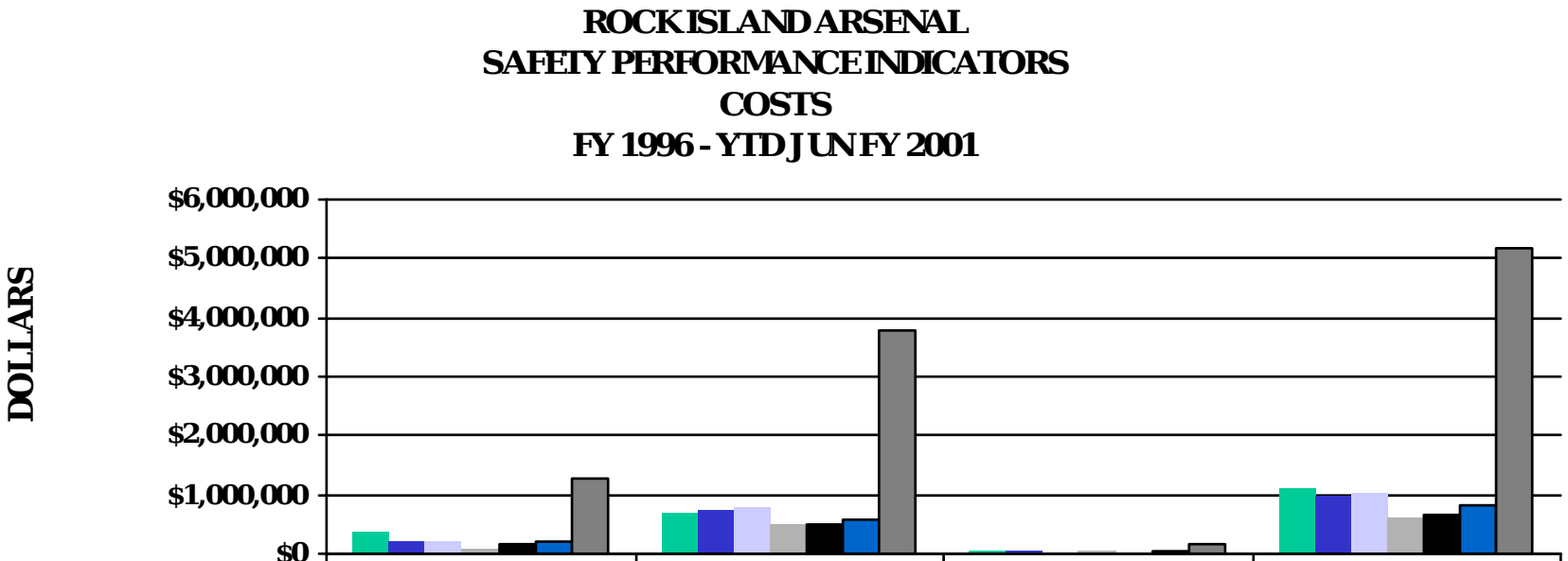

ROCK ISLAND ARSENAL
FREQUENCY RATES - FY 2001
INCIDENT RATE
25
20
15
10
5
0
1.03
1.41
3.28
6.04
5.36
6.04
8.64
12.08
6.96
5.13
LOST TIME
OSHA RECORDABLE
FIRST-AID
TOTAL INCIDENT
SEVERITY
FREQUENCY RATES
GOAL
YTD

Rock Island Arsenal
+/- Goal Status

COST CENTER	+/- GOAL LOST TIME	+/- GOAL OSHA RECORDABLE	+/- GOAL FIRST-AID	+/- GOAL TOTAL INCIDENT	+/- GOAL SEVERITY
01000-Z8000	37%	84%	13%	40%	-26%
01000	-100%	-100%	-100%	-100%	-100%
02000	-100%	-100%	-100%	-100%	-100%
03000	-100%	-100%	-100%	-100%	-100%
04000	-100%	-100%	-100%	-100%	-100%
05000	-100%	-100%	-100%	-100%	-100%
06000	-100%	-100%	-100%	-100%	-100%
07000	-100%	-100%	-100%	-100%	-100%
08000	-100%	-100%	-100%	-100%	-100%
11000	-100%	-100%	95%	-2%	-100%
12000	-100%	100%	-100%	46%	-100%
13000	-100%	-44%	-2%	-29%	-100%
14000-14300	-100%	100%	85%	271%	-100%
15000	44%	73%	-100%	-28%	-77%
16000	-100%	-100%	-100%	-100%	-100%
50000-59600	49%	83%	24%	46%	-9%
60000-64000	438%	115%	139%	127%	438%
E0000-E7000	-100%	43%	-39%	-14%	-100%
L0000	-100%	-100%	-100%	-100%	-100%
Z0000-Z8000	100%	785%	-37%	145%	100%

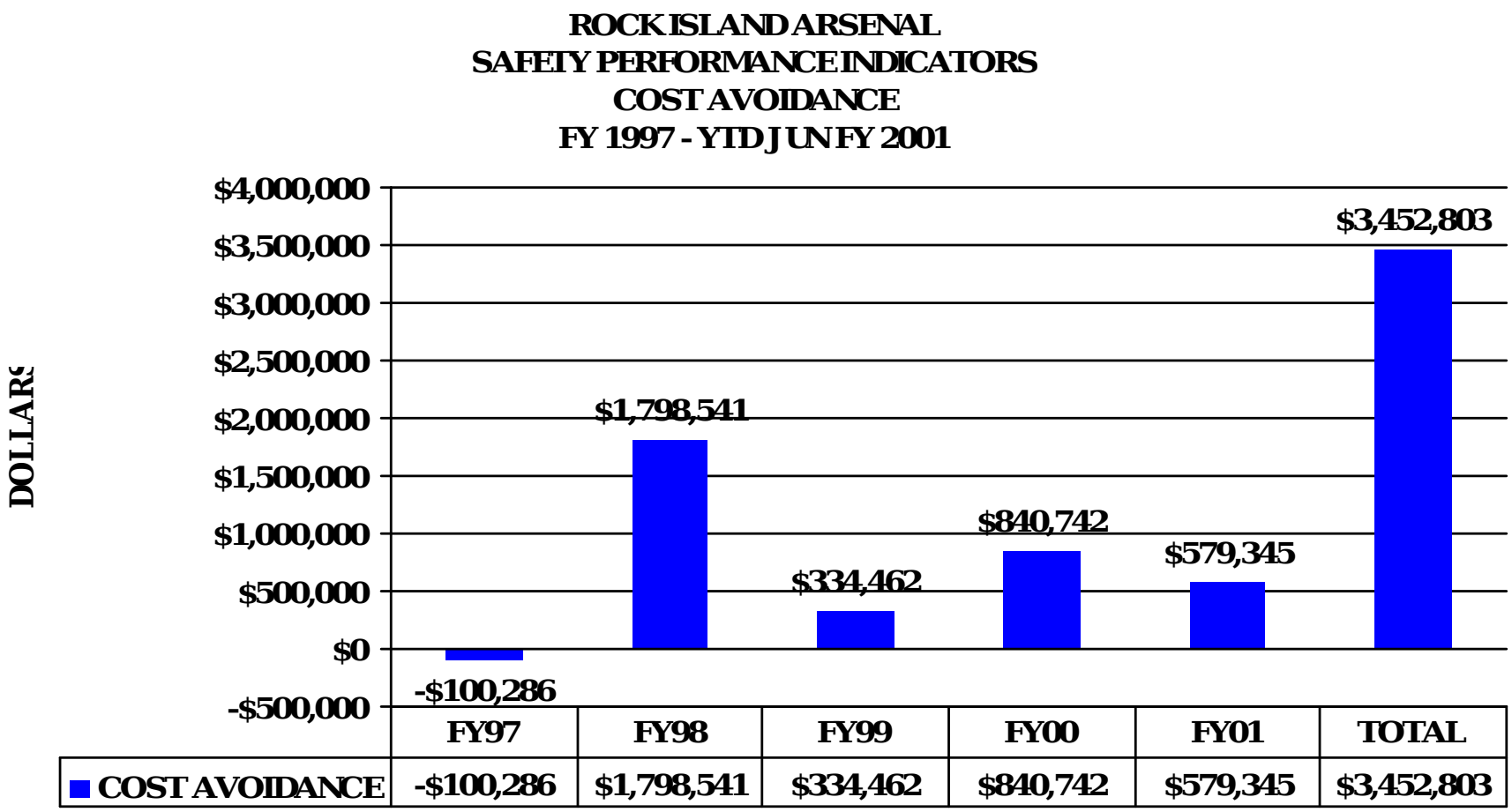
NOTE: NEGATIVE (-) VALUES INDICATE A FAVORABLE REDUCTION OR BELOW GOAL,
WHILE POSITIVE (+) VALUES INDICATE A UNFAVORABLE INCREASE OR ABOVE GOAL.

Current Safety Performance

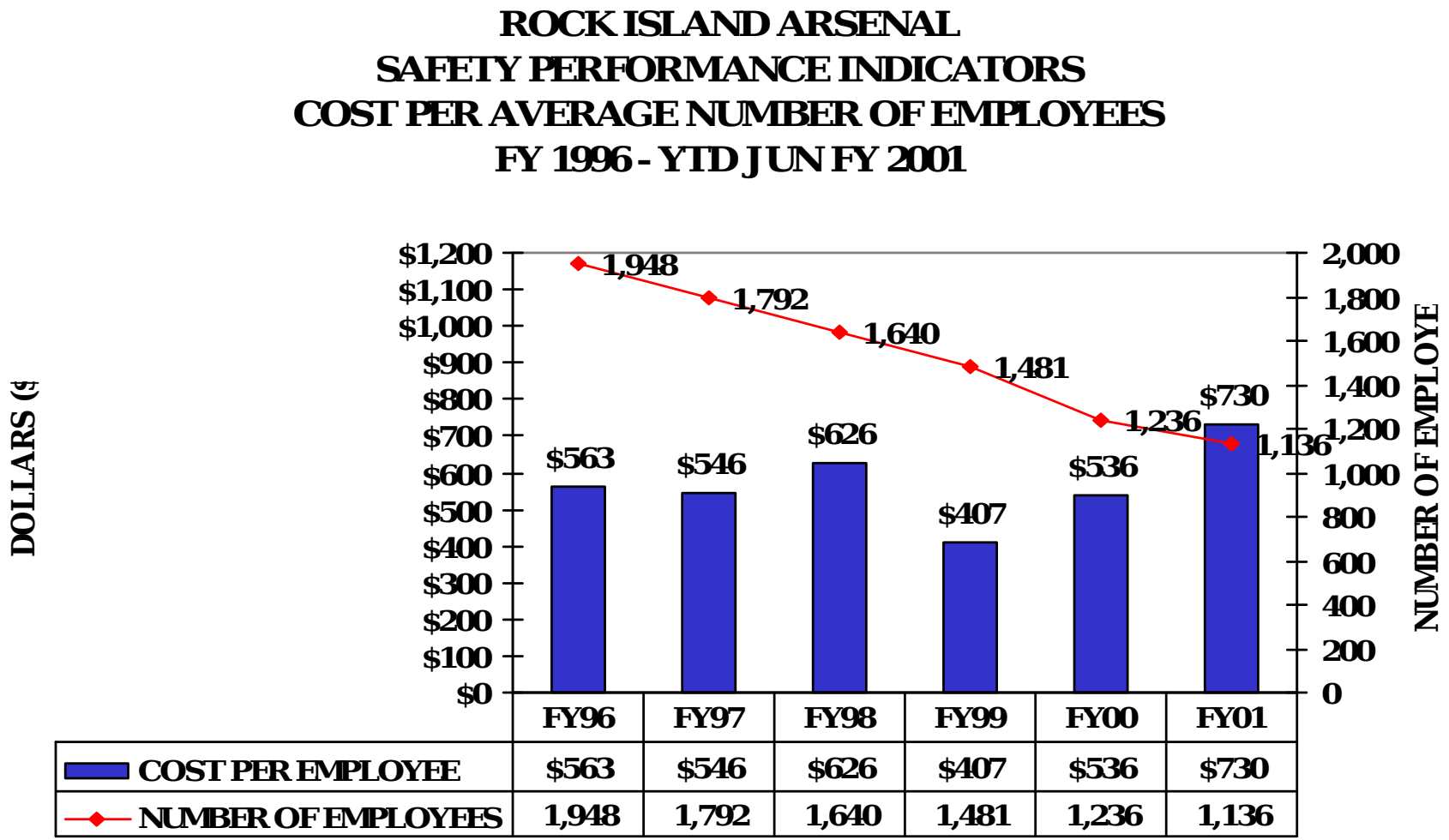


	MEDICAL	COMPENSATION	COP PAID	TOTAL
FY96	$372,364.50	$700,459.53	$24,767.38	$1,097,591.41
FY97	$225,004.84	$721,322.83	$32,069.28	$978,396.95
FY98	$217,400.84	$800,899.01	$8,994.51	$1,027,294.36
FY99	$79,867.29	$496,298.17	$27,296.69	$603,462.15
FY00	$150,207.57	$496,801.86	$15,032.74	$662,042.17
FY01	$225,977.33	$560,713.39	$43,125.41	$829,816.13
ACCUMULATED	$1,270,822.37	$3,776,494.79	$151,286.01	$5,198,603.17

Cost Avoidance



Cost Per Employee



Status of Computer Based Safety Training

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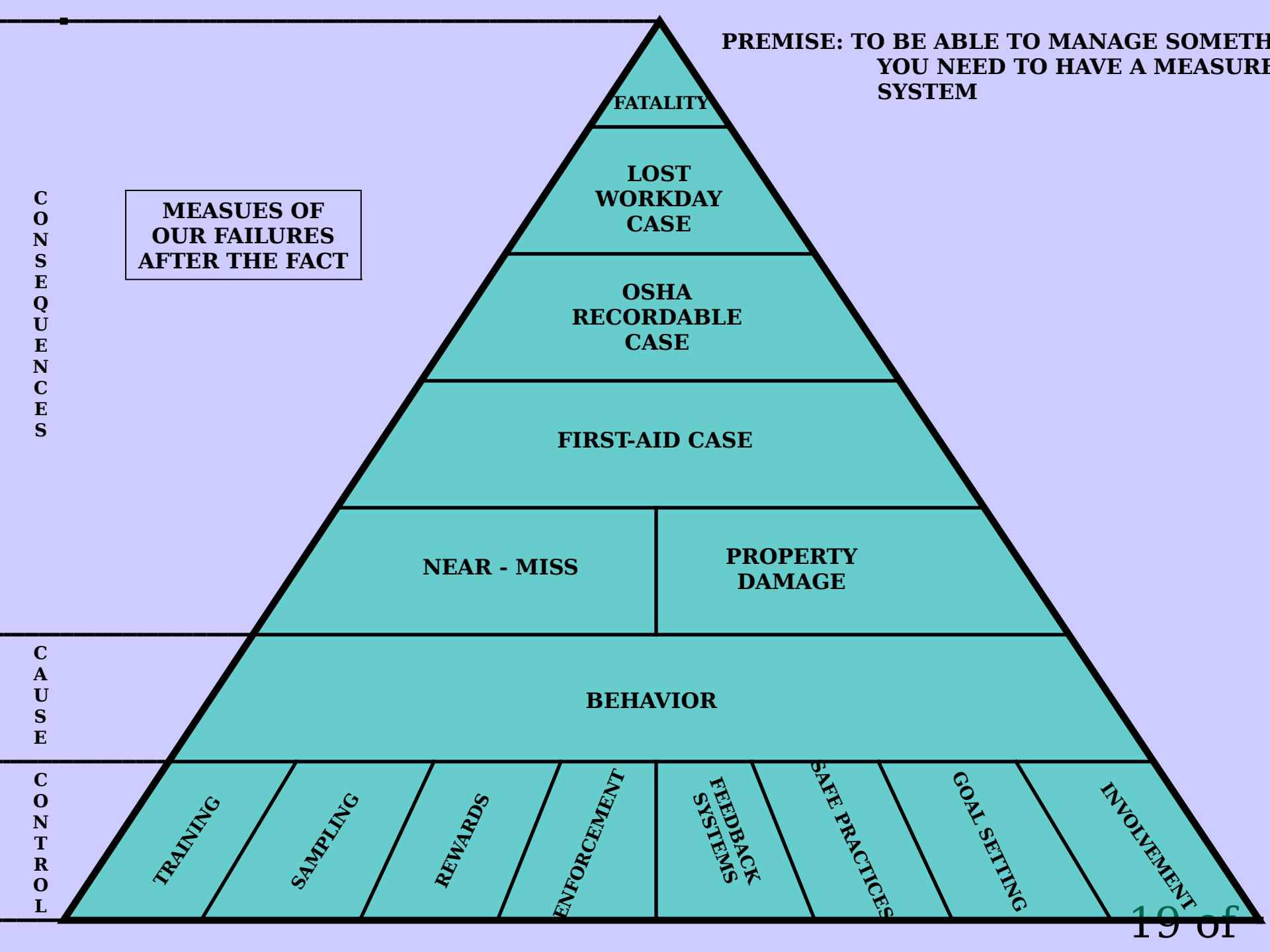
PREMISE: TO BE ABLE TO MANAGE SOMETH
YOU NEED TO HAVE A MEASURE
SYSTEM
CONSEQUENCES
MEASUES OF
OUR FAILURES
AFTER THE FACT
FATALITY
LOST
WORKDAY
CASE
OSHA
RECORDABLE
CASE
FIRST-AID CASE
NEAR - MISS
PROPERTY
DAMAGE
CAUSE
BEHAVIOR
CONTROL
TRAINING
SAMPLING
REWARDS
ENFORCEMENT
FEEDBACK
SYSTEMS
SAFE PRACTICES
GOAL SETTING
INVOLVEMENT

Computer Based Safety Training

- **FY 2002**
  - **Support Corporate Strategy Review Objective**
  - **Maintain “SOSRI-IT Support”**
  - **Make Program Modifications**
  - **Beta Test Group**
  - **Feed Back Sessions with Beta Test Group**
  - **Obtain Targeted High Hazard Topics**
  - **Communicate Training Initiative with Customers**
  - **Report and Publish Successes**
  - **Complete Value Engineering (VE) Study**
  - **Continually Evaluate Performance**
- **Seek “Buy-In” at All Levels**

Safety After Accident Review

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SAARs Completed FY 2001

- 120 Total Injury and Illness
  - 14 Lost Time
  - 60 OSHA Recordable
  - 60 First-Aid
  - 51 Lost Days
- 9 Property Damage

Incident # 1

- Job Title: Motor Vehicle Operator
- Division: Z8000 SOSRI-CFB-R, Recycling Program
- Incident Type: Lost Time
- General Task: Emptying Tip-Tub
- Specific Activity: Releasing Tip-Tub Latch
- Location: Bldg.106 Courtyard

Description of Incident #1

- Employee used fork lift to raise loaded tip-tub above edge of roll-off
- Employee exited cab of fork lift to access tip-tub latch handle
- Employee released tip-tub latch handle

Description of Incident #1

- Tip-tub hopper tipped forward and rocked back striking latch handle
- Resulting movement of latch handle caught employee's left hand between latch handle and angle iron on tip-tub frame

Description of Incident #1

- One finger partially severed
- Another finger severely injured

Equipment / Tools / Material or Environmental Conditions Contributing to Incident #1

- Tip-tub
  - Design of latch and latch handle
  - Leg of angle iron bent toward latch handle
- Fork lift

Unsafe Work Practices Contributing to Incident #1

- **None**

Corrective Actions Taken #1

- **Tip-tub was removed from service**
- **A Job Safety Analysis (JSA) was drafted and will be developed for emptying tip-tubs**

Area Where Accident Occurred

Tip-Tub Position On Fork Lift

Close-up Tip-Tub Latch Handle

Incident # 2

- **Job Title: Sheet & Platemetal Parts Fabricator**
- **Division: 59600 SOSRI-ICK**
- **Incident Type: OSHA Recordable**
- **General Task: Operating Mitsubishi Laser Cutting Machine**
- **Specific Activity: Trying to stop a liquid oxygen leak**
- **Location: Bldg 212, Weld & Sheet Metal Division**

Description of Incident #2

- **Employee:**
  - **Checking for liquid oxygen leak**
  - **Closed supply valve on liquid oxygen vessel and vaporizer system**
  - **Started to unscrew system supply line connector from liquid oxygen vessel to bleed pressure from line**

Description of Incident #2

- **Liquid oxygen line unexpectedly released from fitting and hit employee in face**
- **Employee's:**
  - **Safety glasses were knocked off**
  - **Left lens popped out**

Description of Incident #2

- Left upper lip cut-required six stitches
- Two teeth loosened-left side of mouth

Equipment / Tools / Material or Environmental Conditions Contributing to Incident #2

- 450 liter liquid oxygen vessel connector fitting
- Liquid oxygen system supply line

Unsafe Work Practices Contributing to Incident #2

- None

Corrective Actions Taken #2

- SOSRI-ICK Division Chief contacted oxygen system supplier
- System supplier:
  - Replaced connector fittings on both liquid oxygen vessels
  - Replaced flexible connector line
  - Installed check valve and manual bleed valve in system

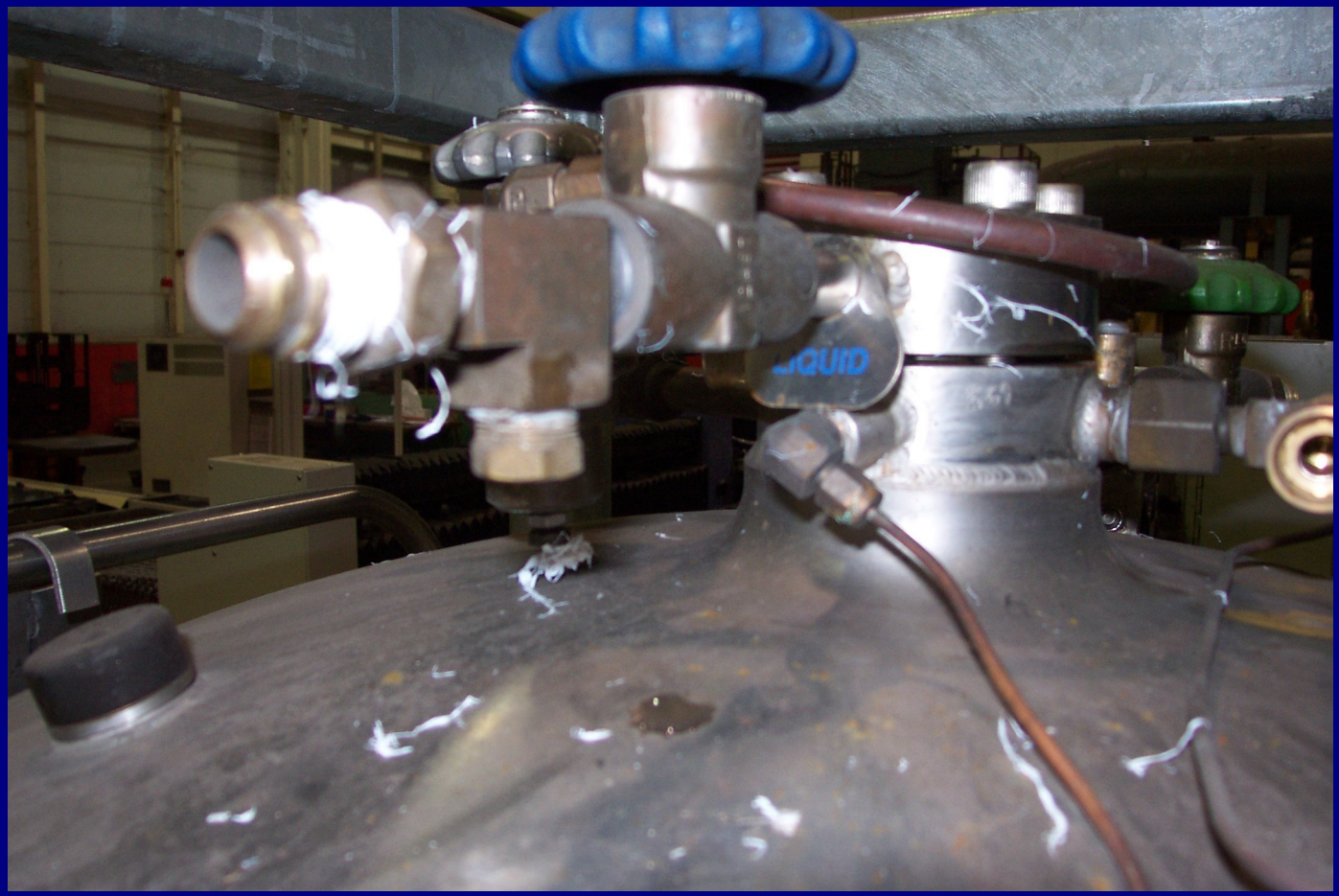
Corrective Actions Taken #2

- System supplier trained SOSRI-ICK Division Chief and available SOSRI-ICK Mitsubishi laser operators how to safely change liquid oxygen vessels

- SOSRI-ICK Division Chief to provide training to other Mitsubishi laser operators

Liquid Oxygen Vessel

Liquid Oxygen Fitting



Manual Bleed Valve Added

Incident # 3

- **Job Title: Flame/Arc Cutter**
- **Division: 58000 SOSRI-ICG**
- **Incident Type: First Aid**
- **General Task: Cleaning Castings**
- **Specific Activity: Loading/Unloading castings from blast table**
- **Location: Bldg. 212W Cleaning Room**

Description of Incident #3

- “Newly” hired employee
- Loading/unloading castings from shake-out onto blast table
- Small particle entered right eye
- Employee was wearing safety glasses with side shields

Equipment / Tools / Material or Environmental Conditions Contributing to Incident #3

- Configuration of casting tree
- High air flow rate from ventilation system

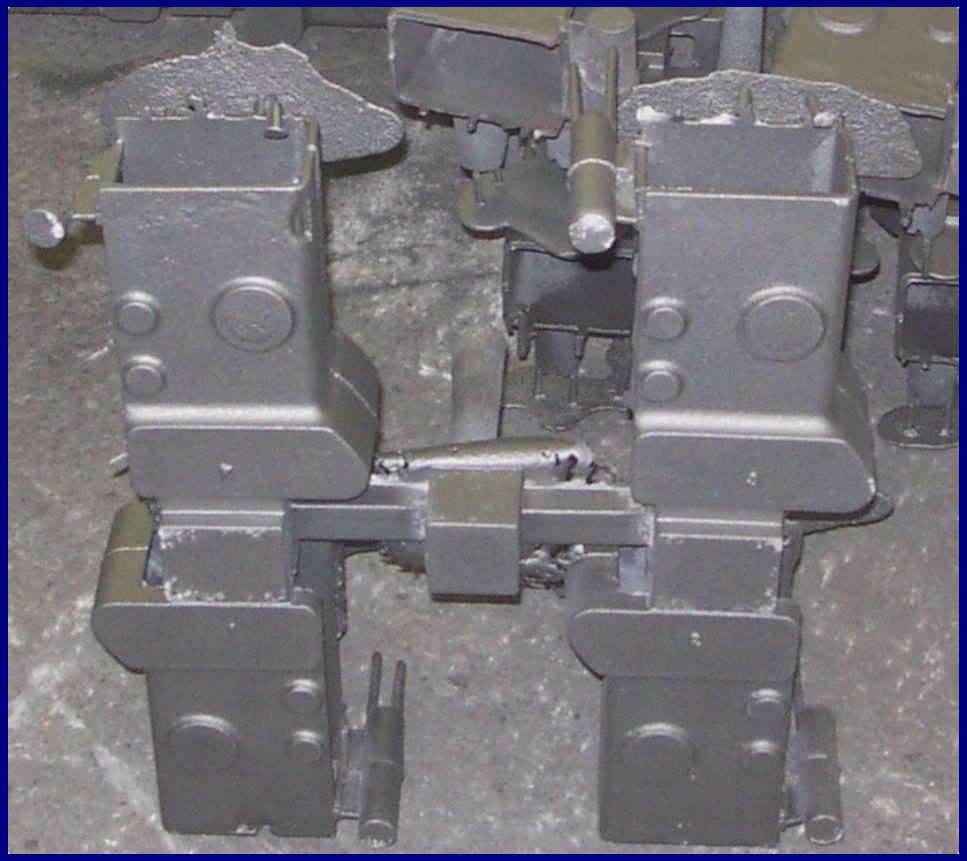
Unsafe Work Practices Contributing to Incident #3

- None

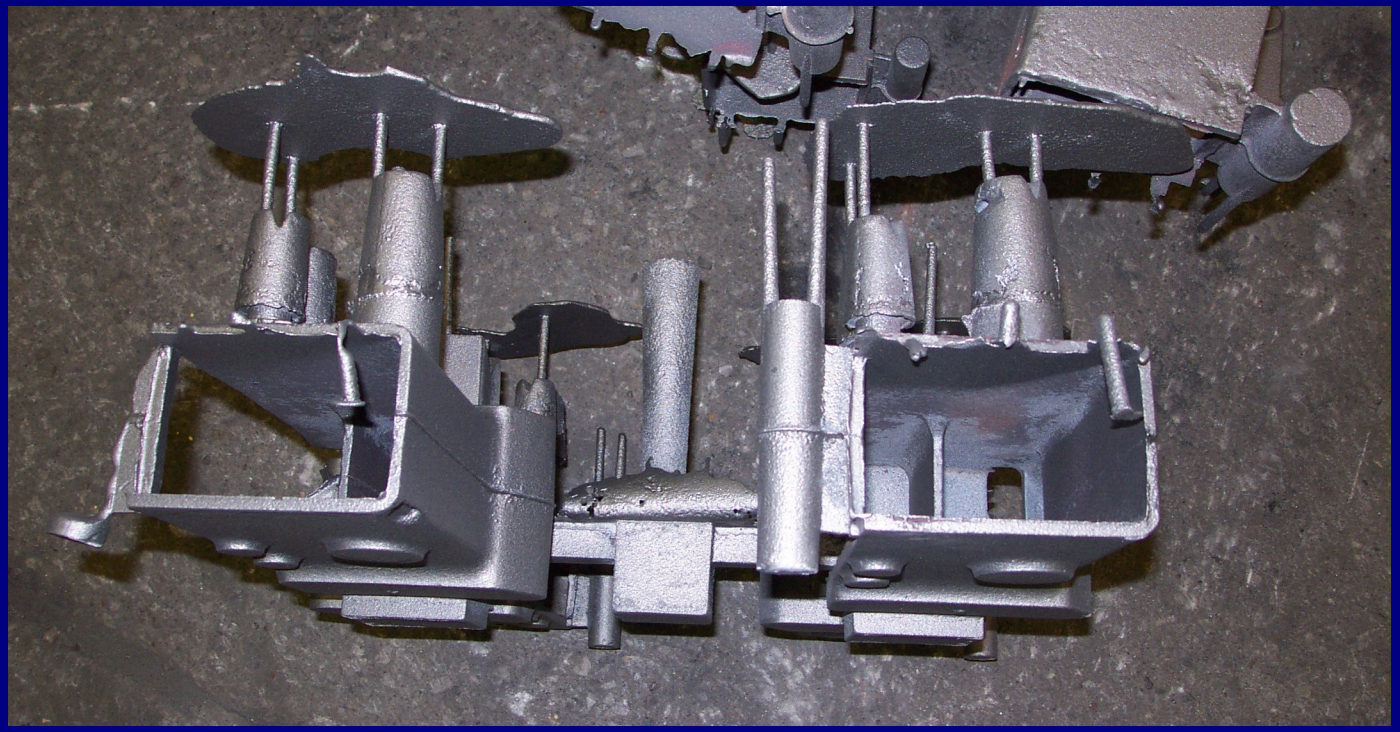
Corrective Actions Taken #3

- **MCXM-PMA to:**
- **Perform PPE Hazard Assessment Survey to determine adequacy of required PPE**
- **Survey area ambient environmental conditions (airborne dust, air movement, etc)**

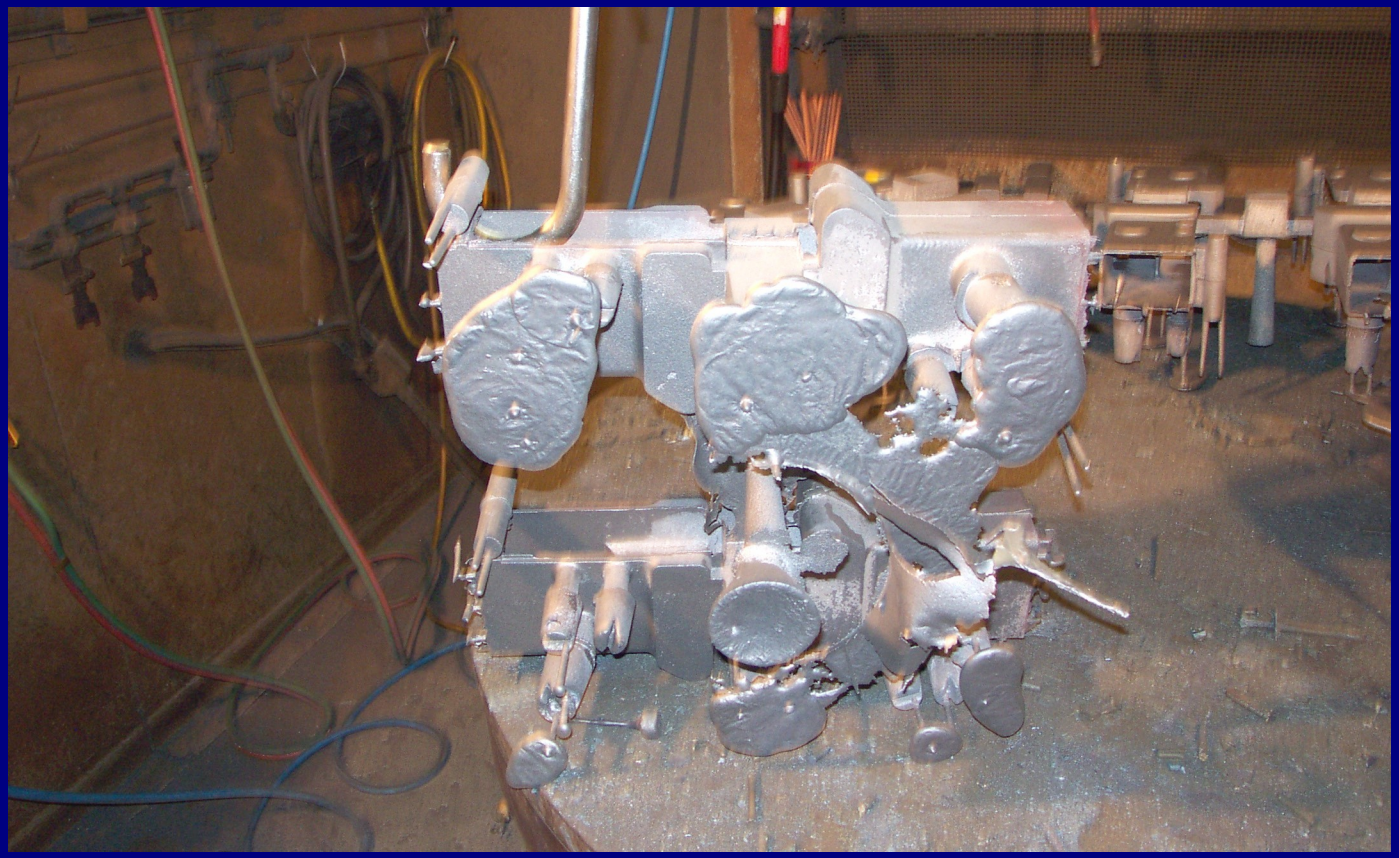
Casting Tree



Cavities In Casting Tree



Risers & Sprues



Air Quality at RIA

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Indoor Air Quality Authority/Guidelines

- **OSHA was unable to establish an IAQ Standard (1998)**
- **Guidelines are available from these organizations:**

1. **American Society of Heating Refrigerating and Air-Conditioning Engineers (ASHRAE)**
2. **Environmental Protection Agency (EPA)**
3. **National Institute for Occupational Safety and Health (NIOSH)**
4. **American Industrial Hygiene Association (AIHA)**
5. **U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM)**

Important Definition

- **EPA… “The term Sick Building Syndrome (SBS) is used to describe situations in which building occupants experience health and comfort effects that appear to be linked to time spent in a building, but no specific illness or cause can be identified”.**

Important Definition

- **EPA… “Building Related Illness (BRI) is used when symptoms of diagnosable illness are identified and can be attributed directly to airborne building contaminants”.**

- **Example: Legionnaires’ disease**

The I.H. Office Prefers to Respond to IAQ Concerns at the request of a Supervisor or Team Leader

- **Frequent Responses:**
  - **Vehicle exhaust, construction dust and odors (solvents) and “sewer gas”, 5 per month average**
- **Formal Surveys in non-industrial work places (not factory related):**
  - **Investigation is extensive and usually involves PW, HVAC Contractor and the RIA Science and Engineering Laboratory. Formal surveys average 6 per year**

Formal Industrial Hygiene

Indoor Air Quality Surveys

- **Period: 1993 - 2001, 54 Surveys Conducted**
- **A Formal Survey Generally Involves:**

1. **Inspection of the air handling system**
2. **Survey of area for moisture problems**
3. **Employee interviews (Questionnaire concerning perceived air quality, thermal comfort and health symptoms)**
4. **Analysis of collected dust samples**

Formal Industrial Hygiene

Indoor Air Quality Surveys

- **Survey Parameters, continued**

5. **Real time measurements of carbon dioxide, carbon monoxide, formaldehyde, volatile organic compounds, airborne particulate (dust), humidity and temperature**
6. **Standard method analysis of specific compounds involved in a complaint (asbestos, fiberglass or chemical allergens)**
7. **Other (dust mites, “paper mites”, etc.)**

Bioaerosols

- Airborne microorganisms (pollen, mold, bacteria) are not sampled. Microorganisms are ubiquitous in nature and are found in all outdoor and indoor air in varying concentrations and types. The deposition of microbial contaminants in buildings occurs universally. However, this deposition is not analogous to growth. Growth occurs only when moisture conditions are conducive to bacterial multiplication or fungal spore germination.

Bioaerosols

- Control is accomplished by eliminating sources of moisture, including high humidity levels above 60%.
- Also, no tolerance levels or guidelines for microorganism “contamination” have been established. Bioaerosols were determined to be the cause of complaints in less than 5% of problem office buildings investigated by NIOSH, most were located in the subtropical gulf states.

Contaminant Exposure Standards

OSHA PEL

CO_2 - 10,000 ppm

CO - 35 ppm

HCHO – 0.75 ppm

Dust – 15 and 5 mg/m^3

VOCs - 100 ppm*

* based on common solvents, xylene, turpentine, naphtha and toluene

RIA IAQ TWA(1)

CO_2 - 1000 ppm

CO - 3.5 ppm

HCHO - 0.075 ppm

Dust - 1.5 and 0.5 mg/m^3

VOCs - 10 ppm

(1)Level not to be exceeded

Typical Survey Results

RIA IAQ TWA	SURVEY ACTUAL
CO_2 - <1000 ppm	CO_2 - 550 ppm
CO - <3.5 ppm	CO - ND
VOCs - <10 ppm	VOCs - ND
HCHO - <0.075 ppm	HCHO - ND
Dust - <0.5 mg/m^3	Dust - 0.02 mg/m^3

< = less than

Recorded Maximums

CO_2 - 1,004 ppm (Building 62 Basement*)**

CO - 4.1 ppm (Building 299 Loading Area)**

Dust - 0.3 mg/m^3 (Building 60 Cafeteria*)

VOCs - 3 ppm (Building 62 Basement*)**

***Before smoking was banned in general area**

****** **Propane powered forklift traffic**

******* **Temporary unventilated office**

Typical Content of Survey Dust

- **Analysis by RIA SMARI-ESM**
- **"This sample was examined using both optical and electron microscopy…. The observed compositions are as follows:**
  - **Particles - calcium silicate, magnesium silicate and potassium chloride. The particles were found clinging to the fibers and were 40 to 50 microns in size. Two particles of a fluorocarbon such as teflon were found.**
  - **Fibers - No asbestos or fiber glass was found. Fibers present were all organic with both natural and synthetic fibers in the mix. The fibers were all similar to those found in lint from textiles and paper".**

"Black Soot Phenomena????" (ASTM)

Thermal Comfort

- **ASHRAE Recommendations:**
  - **Relative Humidity - 30 to 60%**

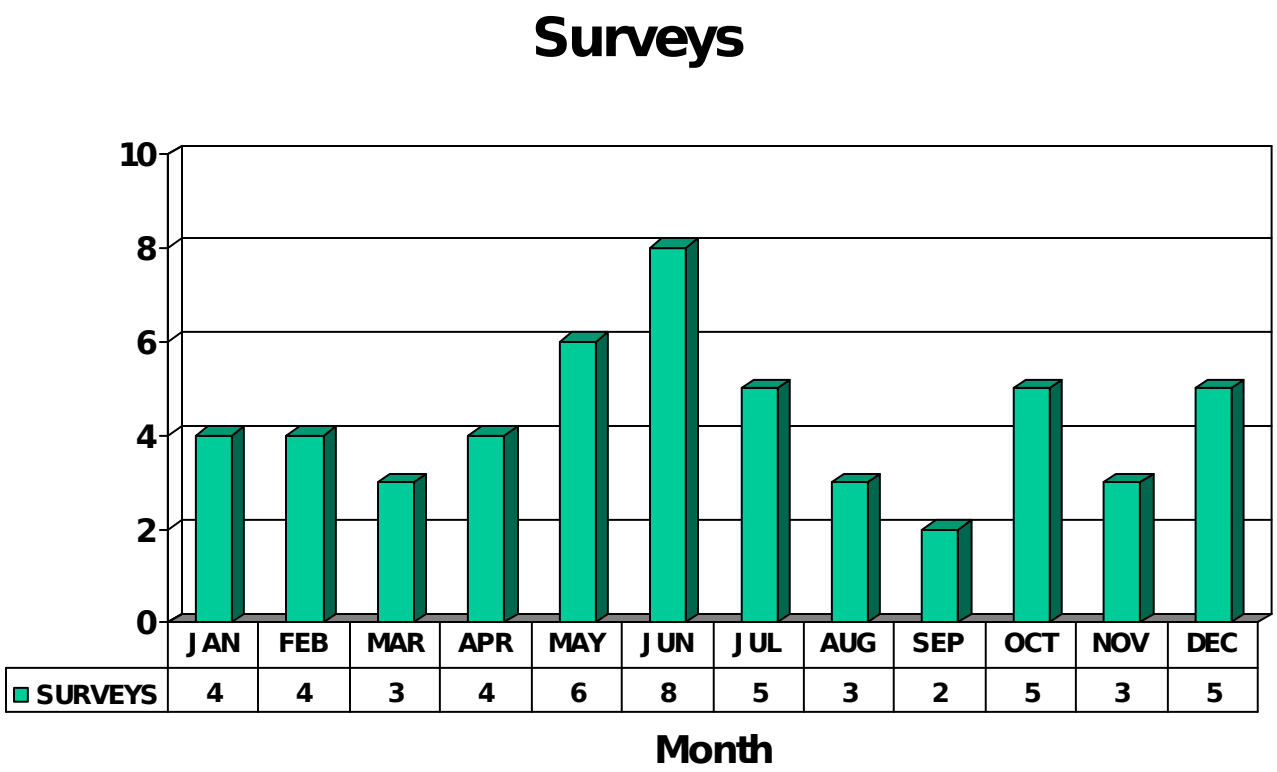
    Typical RIA, Winter (20%) Summer (49%)

    Maximum recorded - 57% in August
  - **Temperature - 68 to 78 degrees Fahrenheit**

    Typical RIA, 75 degrees F

    Maximum recorded - 80.9 degrees F

Are IAQ Complaints Season Sensitive?



Prevalence of Symptoms Occurring at Least Once a Week and Improving Away From Work

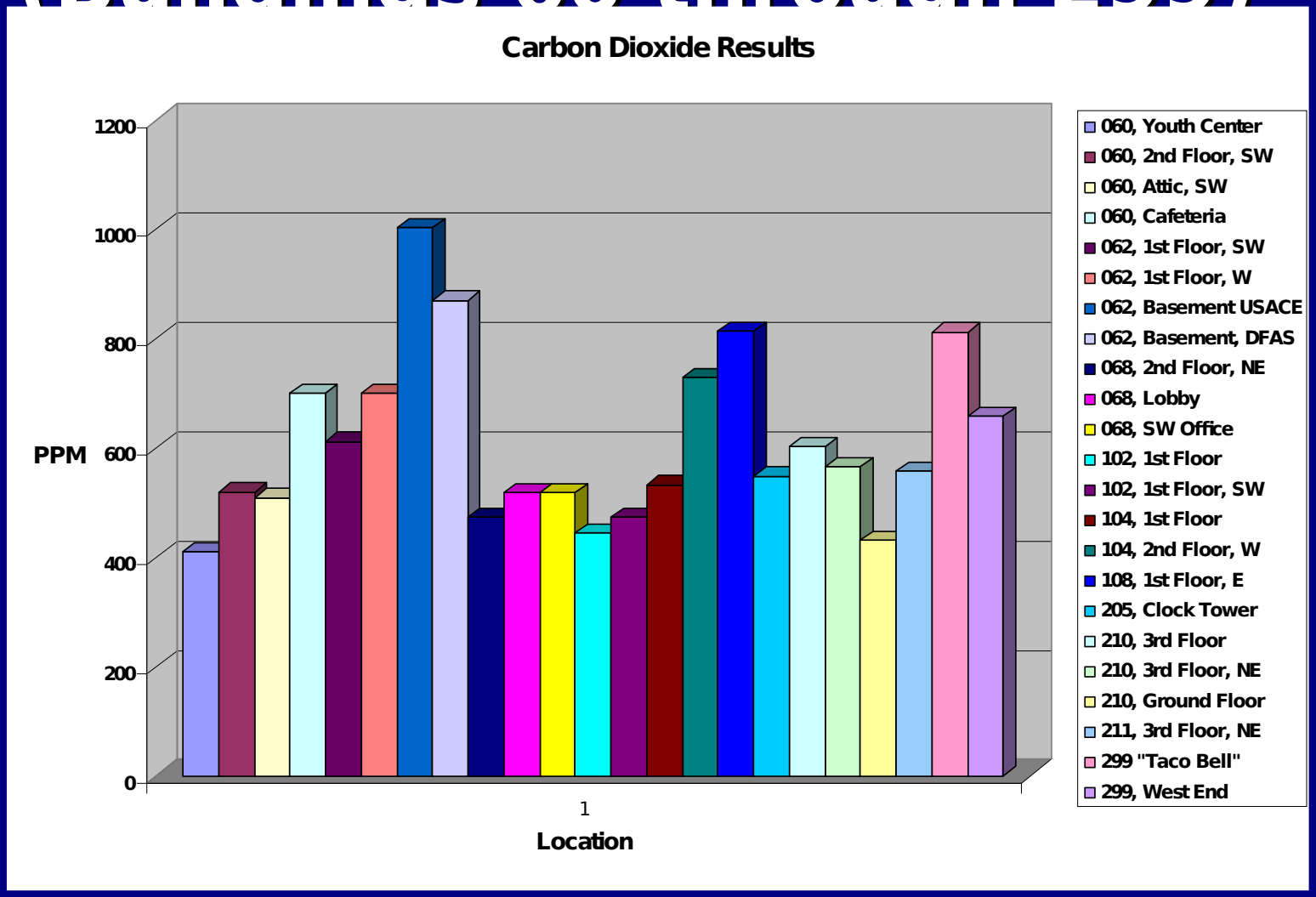
- **80 Buildings Investigated by NIOSH**

Cough	(9%)
Dizziness	(8%)
Dry, Itching Eyes	(30%)
Headache	(25%)
Sore or Dry Throat	(16%)
Stuffy/Runny Nose	(21%)
Wheezing	(4%)

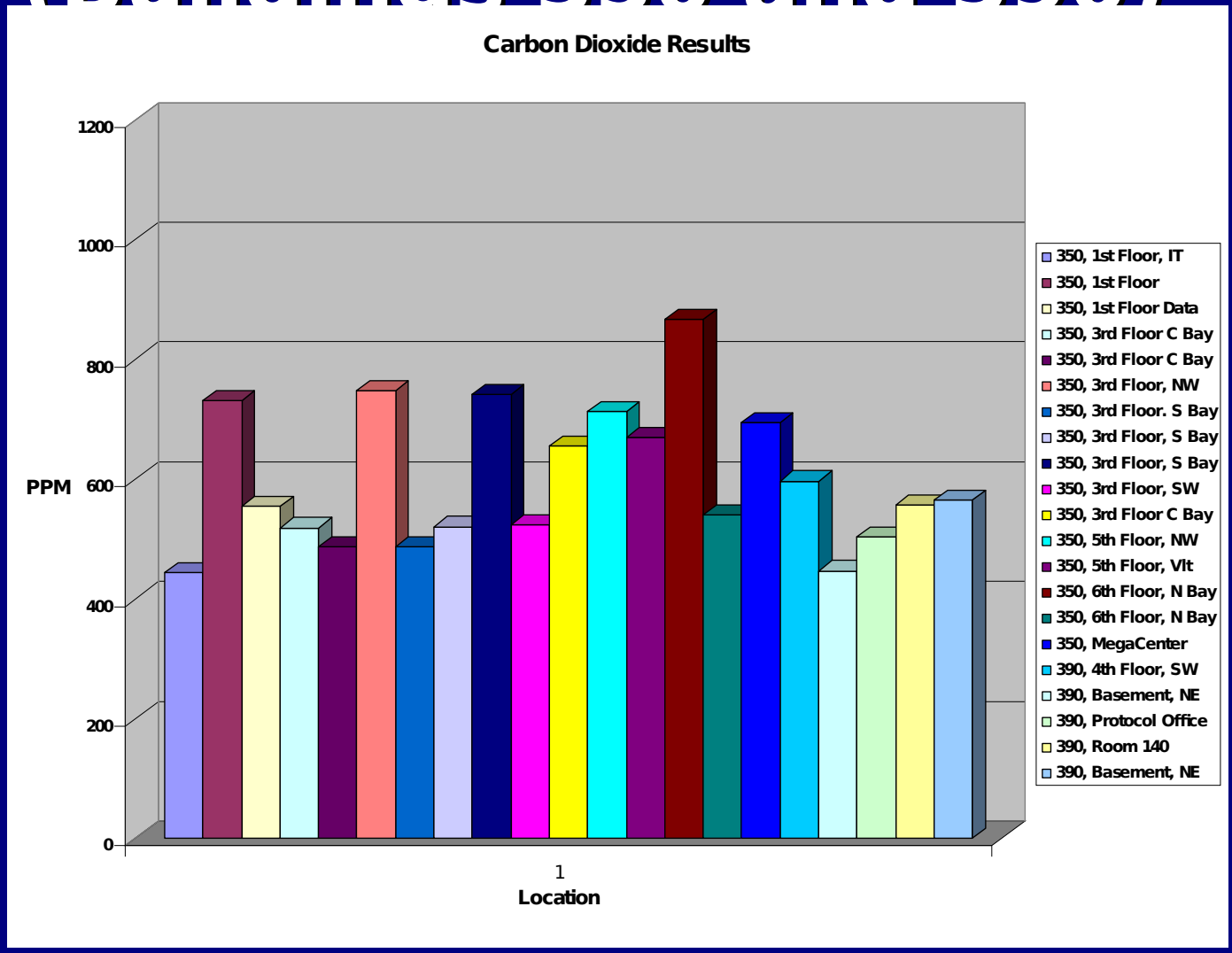
- **EPA Washington State Study of Non-Problem Office Buildings**

Cough	(5%)
Dizziness	(7%)
Dry, Itching Eyes	(30%)
Headache	(24%)
Sore or Dry Throat	(N/A)
Stuffy/Runny Nose	(21%)
Wheezing	(2%)

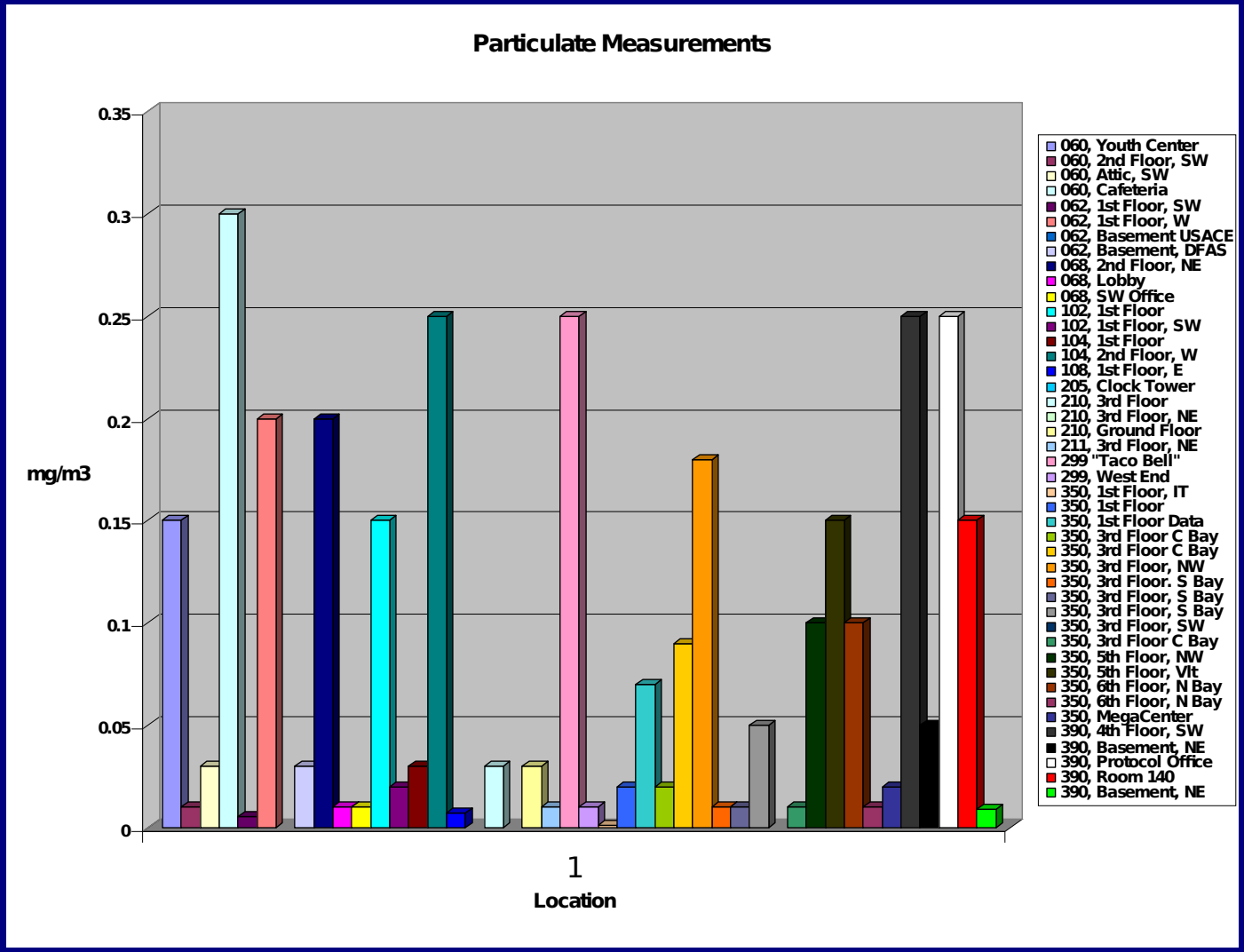
History, Carbon Dioxide Measurements (Buildings 60 through 299)



History, Carbon Dioxide Measurements (Buildings 350 and 390)



History, Particulate Measurements (Buildings 60 through 390)



Issues from the Council

ROCK ISLAND ARSENAL
CENTER FOR EXCELLENCE